

Mathematical Tasks Framework – Task Analysis Guide

Stein, Schwan-Smith, Henningsen, & Silver (2000)

Lower-level demands (memorization):	Lower-level demands (procedures without connections):
<ul style="list-style-type: none"> Involve either reproducing previously learned facts, rules, formulas, or definitions or committing facts, rules, formulas, or definitions to memory. 	<ul style="list-style-type: none"> Are algorithmic. Use of the procedure either is specifically called for or is evident from prior instruction, experience, or placement of the task.
<ul style="list-style-type: none"> Cannot be solved using procedures because a procedure does not exist or because the time frame in which the task is being completed is too short to use a procedure. 	<ul style="list-style-type: none"> Require limited cognitive demand for successful completion. Little ambiguity exists about what needs to be done and how to do it.
<ul style="list-style-type: none"> Are not ambiguous. Such tasks involve the exact reproduction of previously seen materials, and what is to be produced is clearly and directly stated. 	<ul style="list-style-type: none"> Have no connection to the concepts or meaning that underlie the procedure being used.
<ul style="list-style-type: none"> Have no connection to the concepts or meaning that underlie the facts, rules, formulas, or definitions being learned or reproduced. 	<ul style="list-style-type: none"> Are focused on producing correct answers instead of on developing mathematical understanding.
	<ul style="list-style-type: none"> Require no explanations or explanations that focus solely on describing the procedure that was used.
Higher-level demands (procedures with connections):	Higher-level demands (doing mathematics):
<ul style="list-style-type: none"> Focus students' attention on the use of procedures for the purpose of developing deeper levels of understanding of mathematical concepts and ideas. 	<ul style="list-style-type: none"> Require complex and nonalgorithmic thinking – a predictable, well-rehearsed approach or pathway is not explicitly suggested by the task, task instructions, or a worked-out example.
<ul style="list-style-type: none"> Suggest explicitly or implicitly pathways to follow that are broad general procedures that have close connections to underlying conceptual ideas as opposed to narrow algorithms that are opaque with respect to underlying concepts. 	<ul style="list-style-type: none"> Require students to explore and understand the nature of mathematical concepts, processes, or relationships.
<ul style="list-style-type: none"> Usually are represented in multiple ways, such as visual diagrams, manipulatives, symbols, and problem situations. Making connections among multiple representations helps develop meaning. 	<ul style="list-style-type: none"> Demand self-monitoring or self-regulation of one's own cognitive processes.
<ul style="list-style-type: none"> Require some degree of cognitive effort. Although general procedures may be followed, they cannot be followed mindlessly. Students need to engage with conceptual ideas that underlie the procedures to complete the task successfully and that develop understanding. 	<ul style="list-style-type: none"> Require students to access relevant knowledge and experiences and make appropriate use of them in working through the task.
	<ul style="list-style-type: none"> Require students to analyze the tasks and actively examine task constraints that may limit possible solution strategies and solutions.
	<ul style="list-style-type: none"> Require considerable cognitive efforts and may involve some level of anxiety for the student because of the unpredictable nature of the solution process required.